Bonneville Power Administration
Fish and Wildlife Program FY99 Proposal Form

How this form is structured

There are ten major sections to this form. Sections 1 through 5 are database-style fields in which specific information is being sought, so your input is restricted to the gray boxes below. *The boxes are pointers to indicate where to type; they will grow as you type more text, and they won't print as gray boxes.* These sections include: General Administrative Information; Key Words; Objectives, Tasks and Schedules; Relationship to Other Bonneville Projects; and Budget.

In Sections 1 through 5, each field is briefly described on the form itself, and for some fields more tips are shown in the status bar (bottom of the screen). For tables where more rows may be needed than are provided, press Alt-R from within the table to add a row at the end.

Sections 6 through 10 accept a narrative format in which more open-ended questions are asked and you may respond at length in paragraph form. Descriptions are provided on the form. These sections include: Abstract, Description, Relationships to Other Projects, Personnel, Information/Technology Transfer.

Steps to complete the form

1. First, read the Guidelines to Proposals.
2. Second, save this form. For ongoing projects, use your project number.DOC (example: 8909900.DOC). For new proposals, use a filename other than BLANK.DOC, preferrably your agency acronym and your initials (example: NMFSWS1.DOC).
3. Press Tab to move to the first field (Title of Project), and start typing.
   NOTE: When you exit the Project Title or Project Number fields, your screen may display a "Header" box briefly. The form is updating itself, and will continue normally.
4. Fill in all fields (gray boxes) pressing Tab to advance from one field to the next. Then fill in narrative input areas, pressing down arrow to advance.
5. Print the completed document.
6. Save the document to diskette and mail both paper and diskette to:
   Bonneville Power Administration - EW
   ATTN: Connie Little
   FY99 Proposals
   P.O. Box 3621
   Portland OR 97208-3621

Call Jim Middaugh at the Northwest Power Planning Council (503) 222-5161 or (800) 222-3355 or email middaugh@nwppc.org if you have additional questions.

Proposals must be received to Bonneville by 5pm PST on Friday, January 23, 1998. Late proposals will not be reviewed for FY99 funding. This information will be the only material submitted for independent scientific review. It is essential that the relevant information be provided completely but concisely.

Section 1. General administrative information

Title of project. 75 characters or less; do not include the contractor name or acronym; use abbreviations if appropriate; start with action verbs, i.e., "Evaluate Coho...", not "Evaluation of Coho".

Enhance Fish, Riparian, And Wildlife Habitat Within The Red River Watershed

Bonneville project number, if an ongoing project 9303501

Business name of agency, institution or organization requesting funding
Idaho County Soil and Water Conservation District

Business acronym (if appropriate) ISWCD

Proposal contact person or principal investigator:

Name	Mr. Denny Dawes
Mailing Address	Route 1 Box 102-A
City, ST Zip	Princeton, ID 83857
Phone	(208) 875-1246
Fax	(208) 875-8704
Email address	wild@potlatch.com

Subcontractors. List other agencies or entities that will receive funding under this project, either through sub-contracts managed by the project sponsor or, where multiple agencies are involved as joint sponsors, through primary contracts managed by Bonneville. If another entity will be responsible for the long term maintenance of the project, identify them here.

List one subcontractor per row; to add more rows, press Alt-R from within this table

Organization	Mailing Address	City, ST Zip	Contact Name
Wildlife Habitat Institute	Route 1 Box 102-A	Princeton, ID 83857	Mr. Denny Dawes
Pocket Water, Inc.	8560 Atwater Drive	Boise, ID 83714	Mr. Steve Bauer
LRK Communications	228 SW McKenzie	Pullman, WA 99163	Ms. Linda Klein
University of Idaho, College of Engineering	800 Park Blvd., Suite 200	Boise, ID 83712	Dr. Peter Goodwin
Idaho Department of Fish and Game (responsible for long-term O & M	Clearwater Region 1540 Warner Ave.	Lewiston, ID 83501	Mr. Jim White Mr. Calvin Groen

NPPC Program Measure Number(s) which this project addresses. Refer to 1994 Fish and Wildlife Program as amended in 1995; NPPC staff will proof this field and correct if necessary; separate multiple measure numbers with commas.
**4.1 (Salmon and Steelhead Goal: Double Salmon and Steelhead Runs Without Loss of Biological Diveristy), 7.6 (Habitat Goal, Policies, and Objectives), 7.7 (Cooperative Habitat Protection and Improvement with Private Land Owners).

NMFS Biological Opinion Number(s) which this project addresses. If the project relates to the Kootenai Sturgeon Biological Opinion, the NMFS Hydrosystem Operations Biological Opinion, or other Endangered Species Act requirements, enter the Action Number and Biological Opinion Title.
**n/a - project does not relate directly to these programs; however, project is a habitat enhancement project for anandromous and resident fish species, specifically, spring Chinook salmon, steelhead trout, and bulltrout.

Other planning document references. If the project is called for in the National Marine Fisheries Service *Snake River Salmon Recovery Plan*, or in *Wy Kan Ush Me Wa Kush Wit*, the Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama tribes, in U.S. Forest Service or Bureau of Reclamation land management plans, or in local area subbasin or watershed plans, or in other planning documents, provide the name of the plan and reference citation where the need is identified.

If the project type is "Watershed" (see Section 2), reference any demonstrable support from affected agencies, tribes, local watershed groups, and public and/or private landowners, and cite available documentation.
**This watershed project is consistent with the goals of the 1) Wy-Kan-Ush-Me Wa-KushWit; 2) Nez Perce National Forest Plan (1987); 3) Nez Perce Tribal Hatchery Plan (1992); 4) Idaho Department of Fish and Game's Anadromous Fish Management Plan, Resident Fish Management Plan, Elk Management Species Plan, and Nongame Species Plan; 5) ISWCD Five Year Plan; 6) Clearwater Focus Watershed; 7) Columbia Basin Fish and Wildlife Authority's (CBFWA) Integrated System Plan for Salmon and Steelhead Production in the Columbia River Basin (1991); 8) Clearwater River Subbasin: Salmon and Steelhead Production Plan (Nez Perce Tribe and Idaho Fish and Game, 1990); and 9) Interior Columbia Basin Ecosystem Management Project (1994). Letters of support for this project from USFS and IDFG are enclosed. A letter was to be included from Mr. Felix McGowan (Nez Perce Tribe), but Tribe proposal writing kept him from doing so. The Tribe has committed to a letter of support for the Red River 1999 proposal.

Subbasin. List subbasin(s) where work is performed. Use commas to separate multiple subbasins. Coordination projects or those not affecting particular subbasins may omit this field.
**Clearwater Subbasin

Short description. Describe the project in a short phrase (less than 250 characters). Give information that is not in the title. If possible start this field with an action verb (protect, modify, develop, enhance, etc.) rather than a noun (this project protects). There is room for a more detailed project abstract later in the narrative section, so please keep this answer short.
**Restore physical and biological processes to create a self-sustaining river/meadow ecosystem using a holistic approach and adaptive management principles to enhance fish, riparian, and wildlife habitat and water quality within the Red River watershed.

Section 2. Key words

For identifying and sorting, mark key words below that most specifically describe this project. Under each heading (Programmatic Categories, Activities, Project Types), find the **one** item that most applies to your project, and mark it with an X in the Mark column. If other items in the same heading also apply, mark them with a plus sign or asterisk.

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish	X	Construction	X	Watershed
+	Resident fish	+	O & M	+	Biodiversity/genetics
+	Wildlife		Production		Population dynamics
	Oceans/estuaries		Research	+	Ecosystems
	Climate	+	Monitoring/eval.		Flow/survival
+	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement	+	Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords. If there are other key words that would help identify your project, enter them below, separated by commas; example key words: DNA, stock identification, life history, sampling, modeling, nutrient dynamics, predation, hydrodynamics, gas bubble disease, disease names, hatchery-wild interactions, ecological interactions.
** modeling, water quality, riparian plant communities, wetlands, education

Section 3. Relationships to other Bonneville projects

Describe any interdependencies with other projects funded under the Fish and Wildlife Program. Don't include general relationships to other projects, but target those that depend on this project being funded, or vice versa. There is room in Section 7 below to comment on other relationships or to describe these more fully.

If you need more rows, press Alt-R from within this table.

Project #	Project title/description	Nature of relationship
	n/a - no other projects depend on this	n/a

	one for funding	

Section 4. Objectives, tasks and schedules

This section has three parts: a) Objectives and tasks table, b) Objective schedules and costs table, c) other schedule fields. Instructions for each part follow the headings.

Objectives and tasks

Briefly describe measurable objectives and the tasks needed to complete each objective. Use Column 1 to assign numbers to objectives (for reference in the next table), and Column 3 to assign letters to tasks. Use Columns 2 and 4 for the descriptive text. Objectives do not need to be listed in any particular order, and need only be listed once, even if there are multiple tasks for a single objective. List only one task per row; if you need more rows, press Alt-R from within this table.

Obj 1,2,3	**Objective**	**Task a,b,c**	**Task**
1	Restore natural river channel shape, meander pattern, and substrate conditions to enhance the diversity of spawning and rearing habitat for Chinook salmon, steelhead trout, and resident fish species	a	Re-evaluate watershed conditions and engineering design criteria using adaptive management principles
		b	Perform topographic survey of project site and future site within watershed
		c	Develop conceptual restoration design
		d	Review design with Technical Advisory Committee and project sponsor
		e	Complete the detailed engineering design and specifications
		f	Develop permit application package
		g	Survey and stake project site
		h	Set up field office
		i	Deliver materials and equipment and create access roads
		j	Install restoration design features
		k	Establish final grade and prepare

			for revegetation
2	Restore meadow and riparian plant communities to enhance fish and wildlife habitat and stablize streambanks	a	Re-evaluate revegetation design criteria using adapative management principles
		b	Develop conceptual revegetation design
		c	Review design with Technical Advisor Committee and project sponsor
		d	Complete detailed revegetation specifications
		e	Collect native seed, on-site
		f	Grow container seedlings
		g	Collect and store willow cuttings
		h	Provide and install container seedlings and cuttings
		i	Prepare and plant disturbed construction areas with native grass seed mix
		j	Fertilize and irrigate
		k	Build wildlife exclosures and plant with native riparian trees and shrubs
3	Raise public awareness of watershed restoration principles and techniques	a	Review and finalize public information plan with Technical Advisory Committee and project sponsor
		b	Develop web site, video, and slide presentations
		c	Distribute informational brochures
		d	Publish journal articles, conference papers, and press releases
		e	Update on-site public information signs
		f	Add to image library
		g	Develop GIS database and produce maps
		h	Conduct field tours
		i	Initiate local volunteer activities
		j	Provide outdoor classroom opportunities for students of all ages
		k	Develop river restoration model to

			assist future designs of this project and prepare associated manual to transfer technology to other watershed projects
4	Measure success in satisfying long-term project goals, objectives, and outcomes	a	Re-evaluate success criteria using adaptive management principles
		b	Monitor construction turbidity and suspended sediment loads
		c	Measure plant survival rates
		d	Complete Technical Advisory Committee field reviews
		e	Evaluate stream channel response
		f	Measure change in water temperature regime
		g	Measure change in greenline and riparian vegetation composition
		h	Document photopoints for changes in channel stability and riparian vegetation
		i	Evaluate fish populations through snorkel and redd counts
		j	Map changes in fish habitat units
		k	Complete Habitat Evaluation Procedure (HEP)
		l	Measure changes in groundwater elevation
		m	Evaluate surface substrate composition
5	Manage and communicate project activities to efficiently accomplish project goals	a	Assist project sponsor with personnel contract preparation
		b	Develop project and personnel time schedules
		c	Assist project sponsor with permit application submittal
		d	Update and distribute communication plans
		e	Coordinate and facilitate Technical Advisory Committee meetings
		f	Coordinate project activities with project sponsor, landowner, Tribes, agencies, and consultants
		g	Share information with adjacent

			landowners and other public and private interests
		h	Provide on-site construction supervision, communications, and administrative support
		i	Prepare quarterly and annual reports

Objective schedules and costs

Partition overhead, administrative, support, and any other common costs shared among objectives. The percentages for all objectives should total 100%. Enter just the objective numbers from Column 1 in the above table. Enter start and end dates for each objective using the mm/yyyy format (e.g. 05/2002 for May, 2002).

If you need more rows, press Alt-R. **Press Alt-C to calculate total.**

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	3/1998	2/1999	50.04%
2	3/1998	2/1999	12.21%
3	3/1998	2/1999	10.08%
4	3/1998	2/1999	15.37%
5	3/1998	2/1999	12.30%
			TOTAL 100.00%

Schedule constraints. Identify any constraints that may cause schedule changes. Describe major milestones if necessary.
**Extreme weather causing saturated soils or high flow conditions, delay in approval of the 1998 design elements or permits, extreme natural event damaging previously constructed channel features, major equipment breakdown, injury/death of consultant(s)

Completion date. Enter the last year that the project is expected to require funding.
2003

Section 5. Budget

This section has two tables: 1) FY99 budget by line item, and 2) Outyear costs. Instructions for each part follow the heading.

FY99 budget by line item

List FY99 budget amounts for each category. If an item needs more explanation, provide it in the Note column. If project uses PIT tags, include the cost ($2.90/tag). **Press Alt-C to calculate total.**

Item	Note	FY99

Personnel	All figures are FY98	$191,780
Fringe benefits		$67,123
Supplies, materials, non-expendable property		$47,025
Operations & maintenance		$9,850
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		$27,525
PIT tags	# of tags:	$0
Travel		$32,250
Indirect costs		$5,178
Subcontracts		$69,200
Other		$0
TOTAL		$449,931

Outyear costs

List budget amounts for the next four years, and the estimated percentage of those costs for operations and maintenance (O&M).

Outyear costs	**FY2000**	**FY01**	**FY02**	**FY03**
Total budget	$590,000	$580,000	$570,000	$560,000
O&M as % of total	5.00%	7.00%	5.00%	5.00%

Section 6. Abstract

A condensed description to briefly convey to other fish and wildlife scientists, managers and non-specialists the background, objectives, approach and expected results. **In under 250 words,** include the following:

a. Specific items in any solicitation being addressed
b. Overall project goals and objectives
c. Relevance to the 1994 Columbia Basin Fish and Wildlife Program (benefit to fish and wildlife)
d. Methods or approach based on sound scientific principles
e. Expected outcome and time frame
f. How results will be monitored and evaluated

The Red River has been channelized and the riparian habitat corridor eliminated. The river has responded by incision resulting in steepened banks, increased sedimentation, degraded fish habitat, elevated water temperatures, depressed groundwater levels, and significantly reduced hydroperiods. The ongoing Lower Red River Meadow Restoration Project is an on-the-ground ecosystem enhancement effort that restores natural physical and biological processes to establish a sustainable diversity of habitats consistent with the 1994 Columbia Basin Fish and Wildlife Program. This is the fifth year of a ten-year program and construction of the first two phases (over one mile of river) is complete. Plantings

accelerate the native plant colonization, provide diverse habitat features, and increase channel stabilization. State-of-the-science hydrologic and geomorphic models will be used to design future phases, provide decision support for adaptive management, and develop interpretative displays. Comprehensive monitoring of physical and ecological parameters will be used to determine whether the success criteria have been achieved. Linkages and benefits between the local restoration site and watershed will be quantified. The educational and outreach components of the project include interpretive signage, integration of students in monitoring or research activities, a manual of restoration lessons learned in the watershed, and scientific publications. A web-site describing the project and including real-time site conditions and imaging will be established. Monitoring is expected to continue beyond the project time frame for education and research.

Section 7. Project description

This full description of the project should be in sufficient detail to include the following information under headings a through g **(maximum of 10 pages for entire project description)**:

a. Technical and/or scientific background. The overall problem should be clearly identified with background history and scientific literature review, if a research project. Location should be specific, if relevant. Goals and objectives of the 1994 Fish and Wildlife Program (FWP), NMFS Biological Opinion, or other plans in relation to the proposed project should be stated and described in some detail. Indicate whether the project mitigates losses in place, in kind, or if out-of-kind mitigation is being proposed.

Show how the proposed work is a logical component of an overall conceptual framework or model that integrated knowledge of the problem. The most significant previous work history related to the project, including work of key project personnel on any past or current work similar to the proposal, should be reviewed. All work should be adequately referenced and listed at the end of this field.

The headwaters of the Red River form in North Central Idaho about four miles northwest of Green Mountain. The river flows west about 28 miles where it joins the American River to become the South Fork of the Clearwater River. The 1998 project location is in the lower Red River meadow (Sec.19, T.28N.-R.9E.) on the Idaho Department of Fish and Game's (IDFG) Red River Wildlife Management Area (RRWMA).

On a watershed scale, changes in land-use practices have altered the hydrology, sediment delivery, and water quality characteristics of Red River. Construction of reservoirs and hydroelectric dams in the higher-order river systems downstream (Snake and Columbia) has inhibited the migration of anadromous fish species. On a local scale, the river channel has been straightened and riparian vegetation eliminated either in an attempt to maximize the grazing area throughout the meadow or due to hydraulic mining. The channelization of Red River has resulted in several detrimental effects to the ecology of Red River. First, the river has less diversity of instream habitat (pools, riffles, overhanging banks, woody debris). Second, the channel bed has degraded (or downcut) by approximately two feet. Downcutting of the channel bed has been accompanied by a lowering of the groundwater table. As the channel bed is scoured down, the meadow floodplain is inundated less frequently. Changes in groundwater depth and surface-water hydroperiod have resulted in a

drying of the Red River meadow and thus, hydrologic conditions are unable to sustain the native riparian and wetland plant communities once thriving there (Brunsfeld et al., 1996). Third, channelization has reduced the length of river channel, thus increasing the erosive power through the RRWMA. This problem has been compounded by the increased height of the banks as the river has downcut. The process of incision is likely to continue until checked by bedrock or some other geologic or geomorphic control. Finally, the removal of riparian vegetation and the altered geomorphic characteristics of the river (greater water surface width and shallow depths at low flows) have resulted in elevated water temperatures during the summer months. The decline of both resident and anadromous fish populations in the Red River has been proportional to the rate of habitat and water quality degradation [Bonneville Power Administration (BPA), 1996].

The Lower Red River Meadow Restoration Project is an ongoing, "on-the-ground" watershed project, and therefore, committed to long-term habitat improvements that are crucial for restoring natural anadromous fisheries production capability in the Clearwater River subbasin. The restoration philosophy of the project is consistent with the normative ecosystem concept [National Research Council (NRC), 1996; Independent Scientific Group (ISG), 1996]. The design criteria chosen for habitat improvements are based on restoration of the physical processes of the natural river system that will result in sustainable channel characteristics and native riparian plant community. Specifically, the design objectives include restoration of the river meandering form, the hydroperiod in the meadow, the relationship between the groundwater table and the meadow, and the sediment transport regime. Over the past two field seasons the project has restored over one mile of stream channel. This restoration included reconnecting historic channel meanders, constructing new meanders, installing rock grade control structures, and planting native riparian and wetland vegetation. The project has already documented an improvement in the amount of spawning and rearing habitats due to restoration activities in 1996 [Pocket Water, Inc. (PWI), 1997, unpublished monitoring data]. Funding in 1998 and out-years will make it possible to add to these habitat improvements on the RRWMA and private land parcels upstream and downstream.

All previous and proposed work is designed to meet the need for off-site mitigation consistent with the goals and objectives of the Northwest Power Planning Council's (NPPC) 1994 Fish and Wildlife Program (FWP) specifically, "doubling salmon and steelhead runs in Columbia Basin without loss of biological diversity" (4.1), "habitat goals, policies, and objectives" (7.6), and "cooperative habitat protection and improvement with private landowners" (7.7) (NPPC, 1994). Relationships of this project to other region projects and programs are discussed in detail in Sections 7c and 8.

b. Proposal objectives. Specific, measurable objectives or outcomes for the project should be presented concisely in a numbered list. Research proposals must concisely state the hypotheses and assumptions necessary to test these. Non-scientific projects must also state their objectives. Clearly identify any products (reports, structures, etc.) that would result from this project. For example, an artificial production program may state the species composition and numbers to be produced, their expected survival rates, and projected benefits to the FWP. A land acquisition proposal may state the conservation objectives and value of the property, the expected benefits to the FWP, and a measurable goal in terms of production. Methods and tasks (in heading e, below) are to be linked to these objectives and outcomes (by number).

The overall project goal is to restore the diverse physical and biological features of the Red River meadow ecosystem to provide high quality habitat for Chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), bull trout (*Salvelinlus confluentis*), and other anadromous and resident fish species [Idaho County Soil and Water Conservation District (ISWCD), 1995]. To accomplish this goal, the project has set forth the following objectives:

Objective 1. Restore natural river channel shape, meander pattern, and substrate conditions to enhance the diversity of spawning and rearing habitat for Chinook salmon, steelhead trout, and resident fish species: The emphasis in the restoration design is to understand the natural physical processes at work in the Red River and to allow these processes to move the system toward a dynamic geomorphic equilibrium. The restoration work will result in a minimum maintenance condition since the native vegetation and river ecosystem will be self-sustaining and able to adjust to natural perturbations, such as flooding, sediment scour, and deposition.

Objective 2. Restore meadow and riparian plant communities to enhance fish and wildlife habitat and stabilize streambanks: Restoring native plant communities previously removed or repressed from the Red River meadow plays a key role in improving associated riparian habitats. Fish habitats and water temperature benefit from shade provided by shrubs and trees. Under-cut bank habitat and streambank stability increases with root establishment of hydrophytic plant communities. Erosion-resistant root systems decrease bank sloughing, thereby reducing turbidity and improving water quality. Habitat for most bird and mammal species associated with the meadow will improve as density and height of woody shrubs increase.

Objective 3. Raise public awareness of watershed restoration principles and techniques: Recognizing the importance of local involvement and public awareness to maintaining healthy watersheds, the project will continue to provide site tours and will develop educational videos, slide presentations, brochures, journal articles, press releases, and a web site during 1998 and out-years. The University of Idaho (UI) has joined the project to provide technical assistance for many of these activities. The RRWMA will be used as an outdoor laboratory, where people can observe (in a controlled and minimum intrusive manner) the life of anadromous fish in the headwaters of the Columbia Basin, the importance of wise management of watersheds, and the science of restoration.

Objective 4. Measure success in satisfying long-term project goals, objectives, and outcomes: One of the primary criticisms of restoration projects during the past two decades has been the inability to define success. We have developed a series of metrics to measure the ecological value of this project. The monitoring program is used to apply adaptive management principles and will be used to develop guidelines for monitoring similar projects in the region. Through collaboration with the UI, the monitoring of physical and ecological parameters is expected to continue beyond the project time frame for education and research purposes.

Objective 5. Manage and communicate project activities to efficiently accomplish project goals: The intensity, scope, and complexity of this project requires input and support from numerous governmental agencies and public and private interests. The high degree of involvement of these various groups necessitates effective communications and management to ensure project goals and objectives are accomplished in a timely and cost-effective manner. Management and communications personnel will assist the ISWCD in all phases of the project from planning to implementation. Documents relating to the project including Technical Advisory Committee (TAC) meeting minutes, quarterly reports, feedback loop reports, and annual reports will be available to all interested parties.

c. Rationale and significance to Regional Programs. The rationale behind the proposed project should be presented and project objectives and hypotheses related as specifically as possible to the FWP objectives and measures or to other plans. You should

make a convincing case for how the proposed work will further goals of the FWP. Relevant projects in progress in the Columbia Basin and elsewhere should be listed and discussed in relation to the proposed project. Arrangements should be identified and documented for cooperation and synergistic relationships among the proposed project, *other project proposals,* and existing projects. Any particularly novel ideas or contributions offered by the proposed project should be highlighted and discussed.

During the past decade, there has been increasing recognition that quick, local engineering or biological "fixes" for a degraded ecosystem, which neglect the larger scale physical processes, are often of little long-term value (Dister et al., 1990; Falconer and Goodwin, 1994; Havno and Goodwin, 1995; NRC, 1996; Barinaga, 1996; Napa River Community Coalition (NRCC), 1996). The most important element in restoration planning is to restore the natural physical processes at the site (Barinaga, 1996). In addition, hydrologic conditions in the lower Red River meadow prevent re-establishment of the native riparian plant communities based on re-planting alone (Brusnfeld et al., 1996). Based on this philisophy and existing meadow conditions, the ISWCD, TAC, and the project consulting team have chosen a "soft engineering" approach that restores the physical and biological processes to the river system (with minimal bank and channel stabilization measures), allowing the ecosystem to evolve toward and maintain a state of natural, dynamic equilibrium.

Accomplishing the project's objectives will restore overhead and instream cover; provide a source for nutrients and woody debris; increase the quantity of pool, run, and riffle sequences; stabilize streambanks; increase channel length and sinuousity ratio, raise the groundwater table, lower water temperatures, decrease erosion and sedimentation, and increase the quality of spawning gravels. Consistent with the goals of the FWP (1994), these features will improve the quality of fish habitat, increasing the survival of juvenile and adult salmon and steelhead and allowing more offspring to migrate to the ocean. In addition, the amount of wetland area in the meadow will increase due to a rise in water table elevation and re-establishment of natural floodplain function. These conditions will result in the enhancement of the quality and diversity of resting, cover, and breeding habitat for waterfowl and other wildlife.

Pursant to the FWP's (1994) goals relating to private landowner cooperation and public outreach/education, the project's Phase IV will initiate restoration work on private properties adjacent to the RRWMA. This work will provide another opportunity for cooperative habitat protection and improvement. The project is also collaborating with UI to launch an extensive educational and public outreach program to increase public awareness of watershed science and restoration principles. A goal of this project is to become a model for other watershed restoration projects in Idaho so that others can benefit from lessons learned. The RRWMA has the capacity to become a center for workshops and an outdoor classroom for students of all ages.

This ongoing project remains consistent with or complements the goals and objectives of other Federal, state and Tribal resource plans and ongoing restoration work including: 1) Nez Perce National Forest Plan (1987); 2) Salmon and Steelhead Production Plan (Nez Perce Tribe and IDFG, 1990); 3) Nez Perce Tribal Hatchery Plan (1992); 4) Idaho Department of Fish and Game's Anadromous Fish Management Plan, Resident Fish Management Plan, Elk Management Species Plan, and Nongame Species Plan; 5) ISWCD Five Year Plan; 6) Clearwater Focus Watershed; 7) Columbia Basin Fish and Wildlife Authority's (CBFWA) Integrated System Plan for Salmon and Steelhead Production in the Columbia River Basin (1991), and 8) the Interior Columbia Basin

Ecosystem Management Project (USFS and BLM). Additional cooperative relationships are described in Section 8.

d. Project history (for continuing projects). If the project is continuing from a previous year, the history must be provided. This includes projects that historically began as a different numbered projects (identify number *and short title*). For continuing projects, the proposal primarily will be an update of this section. List the following:

- project numbers (if changed)
- project reports and technical papers
- summary of major results achieved
- adaptive management implications
- years underway (see attached spreadsheet)
- past costs (see attached spreadsheet)

The Red River is recognized as a major spring Chinook and steelhead production stream (Nez Perce Tribe and IDFG, 1990) and Red River's upper and lower meadows were identified early on in the FWP as high priority for habitat enhancement (NPPC, 1987). The Lower Red River Meadow Restoration Project encompasses four properties and 4.4 miles of stream channel. The project will have completed its fifth year by the end of 1997, including three years of planning and two years of implementation. By February 28, 1998 the project will have cost $1,215,478. Reports related to the project include (see reference list for details): 1) PWI, 1994a; 2) PWI, 1994b; 3) River Masters Engineering (RME), 1994; 4) ISWCD, 1995; 5) Brunsfeld et al., 1996; 6) BPA, 1996; 7) PWI, 1997; 8) 1st-4th Quarter Reports, 1996; 9) 1st-3rd Quarter Reports, 1997; and PWI et al., 1997.

1993:

BPA, IDFG, Trout Unlimited, Rocky Mountain Elk Foundation, National Fish and Wildlife Foundation, Nez Perce Tribe, and U.S. Forest Service (USFS) purchased one of the four properties in the lower Red River meadow. This property, formerly the Little Ponderosa Ranch (320 acres), was deeded over to IDFG to manage for fish and wildlife benefits as the RRWMA.

1994:

PWI and River Masters Engineering (RME), consultants to the ISWCD, completed an overall design strategy and budget for stream restoration using the FY 1993 funds. The consultants utilized a habitat stream survey, channel morphology survey, and analysis of historical conditions to develop a natural stream restoration approach.

1995:

Project planning and design for the RRWMA area were completed with the assistance of the TAC, representing a broad range of agencies and public interest groups. An environmental assessment (BPA, 1996), a cultural resources survey (Luttrell, 1995), and an analysis of options at Red River (Brunsfeld et al., 1996) were completed during this period. Restoration of the 1.5 miles of stream on the RRWMA was divided into three phases with the intent of completing one phase/year, beginning on the upstream end of the property (Phase I) and finishing on the downstream end (Phase III). Phases IV - VIII will move restoration work to willing landowners upstream and downstream of the RRWMA.

1996:

Phase I project implementation restored 3,200 feet of stream channel including 780 feet of historic channel and 1,270 feet of new channel. Techniques that were tested this year included use of water bladders to divert stream flow, rock sill construction for grade control, log habitat structures, reuse of historic meander bends, reinforced stream banks to divert water into new or historic channels, and jute matting and grass seeding for erosion control. Monitoring turbidity during construction provided an evaluation of best management practices (BMPs) used to mitigate the release of suspended sediment.

1997:
Phase II project implementation reconnected approximately 1,560 feet of historic channel and constructed 780 feet of new channel. Based on lessons learned in 1996, different methods were used for channel diversion, water disposal, and timing of construction activities. Revegetation was a major effort this year with plant installation throughout Phase I and II. Woody plants included 5,714 willow (*Salix spp.*) cuttings, 3,244 river alder (*Alnus incana*) seedlings, and 1,000 red osier dogwood (*Cornus stolonifera*) seedlings. Herbaceous seedlings included 21,337 sedge (*Carex spp.*), rush (*Juncus spp.*), and bulrush (*Scirpus spp.*). Eight wildlife exclosures were built in the Phase I construction area and planted with native riparian plants to monitor browsing impacts on growth and survival rates of new plantings. A comprehensive monitoring program was initiated this year to evaluate changes to stream channels, fish and wildlife habitat, and water quality as described below in Section 7(e). Monitoring results will be incorporated into the 1997 Annual Report. Preliminary monitoring data has shown that the site is meeting or evolving toward satisfying the success criteria. The one exception has been controlling turbidity at brief but critical periods of the construction process. This is a common problem encountered in this type of restoration project and is sometimes handled by releasing the turbid water at times of the year when the water is naturally turbid. The environmental impacts of this increase in turbidity can then be proven negligible. Unfortunately, this is not a viable option in the Red River due to the very short construction time window and is unlikely to be an option in many rivers in Idaho. We are now studying experiences from other regions and will continue to modify our turbidity mitigation techniques to improve this situation. From lessons at Red River, we can develop successful BMPs that may be transferred to similar local and regional restoration projects.

e. Methods. How the project is to be carried out based on sound scientific principles should be described (this is applicable to all types of projects). Include scope, approach, and detailed methodology. If methods are described in detail in another document, summarize here and cite reference. The methods should include, as appropriate, but not be limited to such items as:

- tasks associated specifically with objectives
- critical assumptions
- description of proposed studies, experiments, treatments or operations in the sequence that they are to be carried out
- any special animal care or environmental protection requirements
- any risks to habitats, other organisms, or humans
- justification of the sample size
- methods by which the data will be analyzed
- methods for monitoring and evaluating results
- kinds of results expected

Each proposer should complete the methods section with an objective assessment of factors that may limit success of the project and/or critical linkages of the proposal with other work (e.g., a smolt monitoring program, etc.).

Scope: In accomplishing the goal related to Chinook salmon and steelhead, we recognize that it is necessary to take a more holistic approach by targeting restoration of the riparian meadow ecosystem and accounting for linkages within the watershed. Therefore, additional benefits accrue to riparian-dependent species and upland wildlife habitat. The stated objectives reflect the holistic

view of restoring a riparian ecosystem for multiple fish and wildlife benefits and enhancing water quality. In 1998, the project will assess the performance of the first two constructed phases of the project; adjust the design criteria and methodology using monitoring data results, adaptive management principles, and guidance from agencies and the TAC; prepare the design for and begin implementation of phase III; implement the public outreach/education plan; and initiate a preliminary topographic survey of the adjacent upstream property (Phase IV). The ISWCD and project team plan to use the Lower Red River Meadow Restoration Project as a local and regional demonstration project for other stream restoration and watershed projects.

Approach: The most important element in restoration planning is to restore the natural physical processes at the site. It is the physical processes that will enable a river or wetland to evolve toward a sustainable dynamic equilibrium to which the habitat and ecology are adjusted. In order to understand these physical processes and the implications of various management actions, it is important to evaluate the local site and its linkage to the watershed. Restoring these natural physical processes will create conditions for the re-establishment of the native riparian plant community and the expansion of wetland areas in the meadow floodplain. Riparian vegetation will improve fish habitat by restoring instream and overhead cover, enabling the development of undercut banks, and providing nutrients and instream woody debris. Deep and dense root systems will increase bank stability and reduce erosion thereby improving water quality. The projects' comprehensive monitoring plan evaluates the performance of design features and enables the use of adaptive management principles. Monitoring results, restoration success, and lessons learned will be transferred to others through an extensive public outreach/education program.

Critical Assumptions:

1) The "consecutive-phase implementation" structure of the restoration design, based on a holistic watershed/ecosystem approach, is by necessity a multi-year endeavor. Continuation of the project will ensure that on-the-ground improvements completed to date do not "unravel" in the long-term. The process of degradation in the non-restored reaches is likely to continue until checked by natural geologic or geomorphic controls. The potential, therefore, exists for the development of a physical or associated habitat discontinuity at the most downstream grade control structure of the restored area.

2) The establishment and survival of the native wet meadow/riparian plant communities is dependent on the restoration of the hydrologic conditions necessary to sustain them.

3) Restoring natural river function and processes will result in a long-term trend toward habitat recovery with minimal need for further human intervention.

4) Restoring historic river channel morphology, geometry, and riparian vegetation will result in high quality and diverse instream habitat for spring Chinook salmon, steelhead trout, bulltrout, and other anadromous and resident fish species.

Detailed Methodology (lower case letters correspond to tasks listed in Section 4):

Objective 1. Restore natural river channel shape, meander pattern, and substrate conditions to enhance the diversity of spawning and rearing habitat for Chinook salmon, steelhead trout, and resident fish species:

(a) Linkages between the local site and the watershed will be used in several different ways. During the design period, the variability in sediment loading and changes in upstream hydrology will be assessed and included in the design criteria. This information will enable the range of possible responses of the river reaches in the meadow to be evaluated. Following implementation of the project, changes in channel geometry, sediment size and quantity, and water quality will be

used to assess the relative importance of upstream hydrologic and geomorphologic events through the RRWMA. In addition, the monitoring data will enable the relative benefits of local restoration projects to be quantified at the watershed scale. For example, if the restoration project reduces the water temperature in summer months by a certain increment, we could determine the benefits to the entire watershed if this restoration strategy was extended through all the meadows in the watershed. These kinds of statistics will be useful in scoping other similar projects and demonstrating their potential value in the future. Specifically, this work will include analysis of aerial photographs and preliminary hydrologic analysis at the watershed scale to determine the role of different processes.

(b) Detailed topographic surveys will be undertaken using GPS and ground survey techniques through the restoration area and at reference sites. This survey will also include the expansion of long-term monitoring cross-sections and habitat features. A combination of ground survey and aerial photography will be used to accurately map the planform of the river and future changes.

(c) Recent research has shown the importance of selecting an appropriate model for restoration/management activities (Willetts and Hardwick, 1993; Ackers, 1993; Interagency Floodplain Management Review Committee, 1994; Havno and Goodwin, 1995). In order to develop conceptual restoration design, the UI will apply a meander migration model (based on formulations by Parker, 1984; Larsen, 1995) and a hydrodynamic model (Falconer et al., 1989; Danish Hydraulic Institute, 1996) to simulate water quality, sediment transport and hydroperiod throughout the meadow reaches of the Red River. In addition, analytical tools for the geomorphic characteristics of the channel (for example, Leopold et al., 1995) and surface water-groundwater interactions will be used. The 1998 design will expand the current design criteria through information gathered in the adaptive management monitoring and experiences gained from other watershed restoration projects, for example the Napa River (NRCC, 1996). A detailed conceptual design will be then completed that provides a natural channel alignment, including features to raise the water levels in the incised channel, increase channel length and sinuosity ratio, and biostabilize highly erodable streambank areas.

(d) During the past three years the TAC, ISWCD, and project consulting team have developed a close working relationship. This close collaborative effort will continue throughout each critical stage of the design.

(e) Due to the narrow construction window in any given year, engineering specification and construction documents will be prepared well ahead of time. To minimize any on-site difficulties and ensure the project is constructed in the least disruptive and cost-effective manner, the design and construction documents will be reviewed by the construction contractor prior to permit submittal. Any necessary changes will be made under the direction of the engineer with input from the TAC, ISWCD, and project consulting team.

(f) All in-channel work (below the high water mark) proposed by the project requires two permits: 1) Nationwide Permit 4 (per Section 404 of the U.S. Clean Water Act) issued by the U.S. Army Corps of Engineers (USACE) and 2) Stream Alteration Permit (per Section 42-3805) of the Idaho State Code) issued by the Idaho Department of Water Resources (IDWR). The permit application package is prepared and submitted 6 weeks prior to construction start date to allow sufficient time for review, coordination, and approval among affected agencies. Permit applications include all design plans and specifications, wetland delineation and mitigation plans, and suspended sediment mitigation plans.

(g-j) Upon permit approval, the project site (Phase III) will be surveyed and staked, the field office will be set up, and materials and equipment will be delivered. Access roads will be created. Channel features will be installed and in accordance to the 1998 engineering specification and construction documents and conditions of the permits.

(k) Construction areas will be final graded and prepared for revegetation.

Objective 2. Restore meadow and riparian plant communities to enhance fish and wildlife habitat and stabilize streambanks:

(a) The revegetation design criteria for this project were established after studying historical records and photographs and identifying local plant communities and soil characteristics (Brunsfeld et al., 1996). Using adaptive management principles, recent published data, and the project's 1997 revegetation monitoring data, the revegetation design criteria and critical assumptions will be evaluated and modified as necessary.

(b-c) Early in 1998, a written and illustrated conceptual revegetation design will be reviewed with the TAC and project sponsor.

(d) Upon approval, the detailed revegetation drawings, including plant and material specifications will be completed and incorporated into the engineered drawing package.

(e-f) Native seed from various woody and herbaceous plants was collected on-site during the 1997 field season and has been cleaned and stored at Wildlife Habitat Institute (WHI) in Princeton, ID. In the early spring of 1998, the seed will be stratified and then sown on media in trays for greenhouse propagation of container seedlings.

(g) During the winter of 1998, WHI will collect and trim willow cuttings in preparation for the 1998 field season. The cuttings are stored, in the dormant stage, by sealing them in plastic bags and placing them in a dark nursery cooler until time for planting in the late spring.

(h) Delivery and planting of dormant cuttings can begin as early as June 15th depending on weather conditions. Container woody and herbaceous seedlings can be delivered and planted throughout the field season (June 15th – August 31st). However, early summer plantings are preferred to ensure sufficient root growth, plant development, and higher survival rates. Planting locations and densities are guided by the detailed revegetation specifications, based on the soil erosion potential of various stream reaches and hydrologic requirements of particular species. During the construction process (July 1st-August 15th), WHI will provide expertise and advise regarding soils placement, plant/water relationships, planting schedule, traffic control near planted areas, and final grading.

(i) After construction is completed in Phase III, disturbed areas will be prepared and planted with a native grass seed mix. Erosion control matting will be installed in vulnerable areas to minimize the impacts of erosive processes.

(j) All newly planted vegetation is fertilized and irrigated as necessary. Seed will be collected in the 1998 field season for 1999 planting.

(k) Six additional wildlife exclosures (similar to those constructed in Phase I) will be constructed and planted in Phase II to continue the project's efforts in evaluating browsing impacts on plant growth and survival rates. Exclosures planned for Phase III will be constructed in 1999.

Objective 3. Raise public awareness of watershed restoration principles and techniques:

(a) The public information plan will be finalized and implemented to reach a broad range of age groups and various public and private sectors through a variety of educational materials. The IDFG is interested in developing the project site for educational purposes. Over the past few years, IDFG obtained funds to produce the RRWMA Education Management Plan (1995, unpublished report), purchase interpretive signs, and build a Watchable Wildlife viewing platform.

(b) Several versions of a slide show will be developed, each targeting a specific audience. An interactive web site will be created, in cooperation with the UI, that can be updated periodically with current information. The project will also provide an educational opportunity for a college student to work with a professional on producing a video documentary.

(c-f) Informational brochures will be distributed, journal articles and press releases will be published, and the image library and on-site information signs will be updated.
(g) The UI will also help develop and maintain a GIS database to demonstrate long-term changes to the meadow ecosystem due to restoration activities. Selected images will be posted onto the project web-site.
(h) A public outreach campaign will be initiated to involve volunteers from the local community in restoration activities. Slide presentations will be made at local schools and community group functions.
(i) Site-tours will be given during the field season.
(j) The RRWMA has the facilities to host student tours and field exercises to provide opportunities to learn about fish and wildlife, watershed management, and restoration principles and techniques. The UI is collaborating with the project to jointly monitor project outcomes using undergraduate and graduate level classes. Plans for graduate level research are being developed.
(k) This project is a concentrated effort at stream restoration, which will be used as demonstration site and model for other projects. Model results used for the design process will be used as an interpretative exhibit on-site, featuring animation in an easily understandable graphic presentation. A manual of restoration guidelines will be prepared to document design approach, adaptive management, monitoring, ecological benefits, and lessons learned.

Objective 4. Measure success in meeting long-term project goals, objectives, and outcomes:
(a) Restoration work must often be implemented without complete scientific knowledge of outcomes. Therefore, an extensive monitoring program has been implemented to assess the performance of the project. This site-specific information is used to guide future management decisions thereby optimizing ecologic, geomorphic, and hydrologic conditions in the long-term. The initial list of success criteria developed prior to project implementation is reviewed annually for adequacy. In 1998, all monitoring data will be integrated into an ArcInfo GIS. Monitoring tasks are summarized below and described in detail, with references, in *Lower Red River Meadow Restoration Project: 1997 Monitoring Plan* (PWI, 1997).
(b) In order to measure compliance with the Idaho Water Quality Standards [Idaho Division of Environmental Quality (DEQ), 1996], turbidity is measured continuously during the construction phase of the project. Three automatic, continuous turbidity sensors are located within the meadow that record turbidity (ntus) every 10 minutes. Manual samples are collected to estimate suspended sediment concentration (mg/L) and project load (tons)
(c) Planting success is measured by percent survival of individual species within one year of installation. These data will be integrated into the GIS to analyze variable survival rates between different plant species and planting locations. This information is used to guide future species selection, revegetation design, and planting methods.
(d) TAC field reviews are performed during and after construction to obtain a visual, qualitative assessment of current construction activities and previous implementation features.
(e) Total Station or GPS survey equipment will be used to survey channel features and reference sites, allowing the evolution of the geomorphic channel characteristics to be monitored pre-implementation, post- implementation, and over time. Data collected through the project site will be assembled into a hydraulic geometry database.
(f) Water temperature data will be collected continuously from mid-June to mid-September using waterproof data loggers. This monitoring data will allow the improvements in water temperature to be documented as a function of changes in the hydraulic geometry, interaction with groundwater, and vegetative cover.

(g) The extent and quality of the restored riparian plant community, compared to the potential natural community, will be measured using greenline and riparian community composition transect methodology (USFS, 1992; Cagney, 1993; Bureau of Land Management, 1993).
(h) Photopoints will be used to document visual changes in channel stability and riparian vegetation. This photographic record will also be a component of the project manual being prepared as a restoration guidebook.
(i) Fish populations are evaluated annually by the IDFG through snorkel and redd counts. In 1998, the UI will assist in installing and maintaining an underwater camera to track fish species' utilization of pool habitats.
(j) Detailed maps of specific geomorphic features (microhabitats or fish habitat units) created or enhanced by project design implementation will be surveyed and included in the GIS.
(k) Via a cooperative arrangement with IDFG, a Habitat Evaluation Procedure (HEP) will be completed annually to measure changes in habitat quality for specific wildlife species.
(l) Long-term groundwater monitoring stations will be installed to measure the recovery of the groundwater table following the restoration implementation.
(m) Sediment samples will be collected and analyzed to evaluate changes in surface substrate composition to document improvements for fish habitat. Samples will include Wolman pebble counts (Wolman, 1954) and particle size analyses of disturbed samples. For the purpose of the computer models, samples will be taken in the surface layer and 10cm beneath the surface.

Objective 5. Manage and communicate project activities to efficiently accomplish project goals and objectives:
(a-d) Project communications and management personnel will assist the ISWCD with personnel contract preparation, project and personnel time schedules, permit application submittal, and communication plans.
(e) Communications personnel will organize, facilitate, and prepare minutes of the Technical Advisory Committee meetings. TAC recommendations on project design and implementation need to be conveyed accurately so that the project sponsor can make informed decisions. An efficient decision-making process is crucial for the timing of permit application requirements that must precede the field season.
(f-h) The communications and management personnel are on-site during the implementation phase to provide construction supervision, transfer of information to all involved parties, and administrative support. Effective coordination of field season activities will ensure all work is completed within the narrow window (July 1st - August 15th) imposed by regulations that protect fish and wildlife habitat and water quality. Furthermore, field season activities are coordinated in such a manner to minimize impacts to other land uses within the watershed. The DEQ is kept informed at all times of water quality status during project implementation.
(i) Project activity reports are prepared each quarter and a formal annual report is published. All reports are submitted to the BPA and ISWCD and copies are made available to all interested parties.

f. Facilities and equipment. All major facilities and equipment to be used in the project should be described in sufficient detail to show adequacy for the job. The proposal should indicate whether there are suitable (based on contemporary standards) field equipment, vehicles, laboratory and office space and equipment, life support systems for organisms, and computers, for example. Any special or high-cost equipment to be purchased with project funds should be identified and justified. Reference to other

proposals is allowed but note that limitations of those proposals could effect the evaluation of the ones citing them.

Office space and communication equipment:
During planning meetings with the TAC or between the sponsor and participating consultants, office space is generally provided, at no cost, by one of the participants. Laptop and personal computer equipment and supplies required for these meetings, as well as presentation equipment such as slide and overhead projectors are typically provided by the participants at no cost to the project. A 200 square foot, portable field office is leased during the field season (mid-June through mid-September) and set up in a central, but non-intrusive location on site. Telephone and electrical service is hooked up and office supplies and equipment (computer, printer, fax, telephone, answering machine, and furniture) are leased. Communications between personnel at work in the meadow and the field office requires foot travel of distances greater than ½ mile. Efforts to deliver simple messages have been an inefficient use of time. A FRS-band radio base station and portable radios will be installed to improve communication efficiency.

Education equipment:
The specialized equipment and services required to produce slide shows, brochures, an educational video, and update informational signs and the image library will be provided by subcontractors or agents specific to the task (e.g. photo shop, printing services, sign company). A project outreach plan to combine monitoring and education includes linking a remote, underwater camera to an Internet web site and vistor center. School students of all ages will be encouraged to assist monitoring fish passage, pool habitat, and site conditions. Equipment required will include a Micro Sea Cam underwater camera, a JVC KY-F55BU Surveillance camera, and Deep Sea Power and Light Camera control unit, transmitter, and miscellaneous hardware. A Pentium computer for the RRWMA can be used as an interpretative display and relay of remote sensing information to UI. Separate grants will be targeted for application to share funding for these educational endeavors.

Field and construction equipment:
Completion of the channel restoration work within the narrow construction window (July 1st - August 15th) will require two track excavators with 1.5-2 yard buckets, a D8 bulldozer, a D4 finish bulldozer with rippers, and miscellaneous support equipment and supplies (fuel, tool truck, etc.). A six-inch water pump with intake and supply lines and a gas or diesel motor will be needed for dewatering constructed or existing channels. This equipment will be specified and supplied through a construction subcontract. Irrigation equipment including five, two-inch water pumps, 58 20-foot sections of two-inch irrigation lines, and assorted tools have been purchased by the project. This equipment is available on-site to supply water to newly planted seeds, seedlings, and cuttings. Four-wheel ATVs have proved an effective means to deliver personnel, equipment, and supplies to the project site. A four-wheel ATV has been leased in the previous field seasons. Lease or purchase arrangements will be considered for a four-wheel ATV in the 1998 season. Tillage, planting, and fertilizing equipment will be supplied by the revegetation contractor. Fencing equipment and tools such as post drivers, stretchers, wire reels, and other hand tools will be supplied by the fencing contractor.

Technical and monitoring equipment:
Survey equipment such as total stations, transits, rods, global positioning systems, computer aided design software, and other computer hardware and software will be provided by the engineer consultant/contractor as part of their contract for services unless otherwise specified by the contract. UI will provide the project with computer facilities in the UI Eco-Hydraulics Laboratory and software to be used in the design and data processing. Some of this software costs over

$15,000 but will be used in this project design as an in-kind donation. Turbidity sensors, data loggers, flow meters, cameras, computers, and other water quality and monitoring equipment have been supplied by PWI in the past. Six additional pressure transducers for groundwater monitoring will be purchased for the project. An additional data logger and transducer are needed to re-activate a stream gage in the watershed. The project will coordinate with the USFS to obtain watershed data supplied by the Red River Ranger Station hydraulic monitoring station.

g. References. (Not included in 10-page limit for this section.) Provide complete citations to all publications referred to in Sections 6a-f. List in order: author(s), date, title, report number, publisher or agency, location. References will not be read by reviewers; the substance of any reference should be described in the text and the source cited. Sample citation:

> Rondorf, D.W., and K.F. Tiffan. 1997. Identification of the spawning, rearing and migratory requirements of fall chinook salmon in the Columbia River Basin. Annual Report 1995. DOE/BP-21078-5, Bonneville Power Adminsitration, Portland, Oregon.

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Brunsfeld, S.J., D.G. Dawes, S. McGeehan, and D.G. Ogle. 1996. An analysis of riparian soils, vegetation, and revegetation options at Red River. D.G. Dawes (ed.) Report to Pocket Water, Inc., Idaho Department of Fish and Game, Bonneville Power Administration, and Idaho County Soil and Water Conservation District.

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Section 8. Relationships to other projects

Indicate how the project complements or includes collaborative efforts with other projects; put the work into the context of other work funded under the FWP. If the proposed project requires or includes collaboration with other agencies, organizations or scientists, or any special permitting to accomplish the work, such arrangements should be fully explained. If the relationship with other proposals is unknown or is in conflict with another project, note this and explain why.

This is not intended to duplicate the Relationships table in Section 3. Instead, it allows for more detailed descriptions of relationships, includes non-interdependent relationships, and includes those not limited to specific Bonneville projects.

Related Projects:
Red River drainage is part of the coordinated restoration program of the Clearwater Subbasin Focus Watershed (sponsored by the Idaho State Soil Conservation Commission and the Nez Perce Tribe, Project #9608600), one of the 31 subbasins in the Columbia River Basin. Meadow Creek is a related and complementary restoration project in the South Fork Clearwater drainage (sponsored by the USFS, Project #9607700). Another restoration project, funded by BPA, is being initiated in the Macomas Meadows of the Nez Perce National Forest. A representative of that project has already been a guest at a Red River TAC meeting to gain insight and knowledge about undertaking a restoration project of this type.

The Lower Red River Meadow Stream Restoration project is part of the Lower Red River prescription watershed called for in the Nez Perce National Forest Plan (1987). This project collaborates with and compliments the numerous habitat improvement projects

completed, in progress, or planned for other reaches of the Red River watershed and all other prescription watersheds within the Nez Perce National Forest that supply the South Fork of the Clearwater drainage. Since 1984, the BPA and Nez Perce Forest have focused restoration activities on critical habitats in these prescription watersheds using bank stabilization, fencing, and vegetative planting (Baer et al., 1990; Siddall 1992). The USFS upper Red River Meadow Stream Restoration project (Mullins property) provided an example of restoration techniques for this project and a wildlife fencing exclosure project at the downstream end of the lower meadow provided examples of native, woody and herbaceous riparian vegetation once abundant throughout the lower meadow.

The Red River Hatchery, a spring Chinook rearing facility, at the confluence of the Main Red River and the South Fork Red River receives funding from the "Lower Snake River Compensation". This hatchery assists the restoration of the anadromous fish runs via supplementation techniques for the Crooked River, Red River, and the South Fork of the Clearwater drainages.

Agency Cooperation and Support:
The Technical Advisory Committee (TAC) for the Lower Red River Meadow Restoration Project meets regularly throughout the year to review designs and plans and advise the ISWCD in the decision-making process. Members of the TAC include representatives from diverse backgrounds, providing a wide range of expertise and support including:

1) **Nez Perce Tribe:** watershed management, tribal fisheries, cultural expertise
2) **Idaho Fish and Game:** landowner; fisheries and wildlife expertise
3) **Idaho Division of Environmental Quality:** water quality expertise
4) **Nez Perce National Forest:** local cooperating agency; hydrology expertise
5) **Clearwater Focus Watershed:** coordination support; administers watershed goals
6) **Idaho State Soil Conservation Commission:** state support; advises and supports ISCWD
7) **Bonneville Power Administration (BPA):** represents funding agency interests
8) **Idaho County Soil and Water Conservation District (ISWCD):** project sponsor; local community support; private landowner liaison (will aid in securing cooperative, long-term agreements for stream restoration work with willing private landowners within the watershed)
9) **Natural Resources Conservation Service (NRCS):** federal and local community support; communications support with local private landowner

Collaboration with Other Organizations and Scientists:
The Eco-hydraulics Research Group (ERG) at the UI is actively seeking grants that would add a research element to this ongoing implementation project. These grants are to

improve teaching at grade schools and universities, to refine existing hydrologic models of the interaction between floodplains and rivers, and to expand models integrating hydrologic, geomorphic and ecologic response. Collaborative funds secured to date include:

1) University of Idaho Seed Grant 1997-98: **$6,000**
2) In-kind Support (Faculty Salary, associated Fringe Benefits and Indirect Costs) During academic year, one-month support of EcoHydraulics Research Group Faculty (Drs. Goodwin and Jankowski): **$9,700**
3) Use of computer software and facilities: Software programs are valued in excess of $25,000

Total: $15,700 plus use of specialist computers and software

Permits:
All in-channel work (below the high water mark) proposed by the project requires two permits: 1) Nationwide Permit 4 (per Section 404 of the U.S. Clean Water Act) issued by the U.S. Army Corps of Engineers (USACE) and 2) Stream Alteration Permit (per Section 42-3805) of the Idaho State Code) issued by the Idaho Department of Water Resources (IDWR). Permit applications must be submitted 6 weeks prior to construction start date to allow sufficient time for review, coordination, and approval among affected agencies. Permit applications include all design plans and specifications, wetland delineation and mitigation plans, and suspended sediment mitigation plans. Permits must be located on-site and permit conditions adhered to at all times during the construction period. Should a request for modification of permit conditions become necessary during the construction period, the project must stop all work related to the request until clear direction is given from the USACE or IDWR. Representatives from the USACE and the IDWR have attended TAC meetings to advise the project concerning policy and regulations.

DEQ water quality standards must be upheld during the construction phase of the project according to the BMPs, detailed mitigation plans, and conditions set forth in the permits. Turbidity is monitored constantly throughout the construction phase to ensure compliance with water quality standards. BMPs are followed, evaluated, and adjusted when necessary to comply with water quality standards. A feedback loop with DEQ is in place in the event of a short-term water quality violation (> 50 ntus above background in one 24 hour period or > 25 ntus for 10 consecutive days) due to construction practices.

Section 9. Key personnel

Include names, titles, FTE/hours, and one-page resumes for key personnel (i.e. principal investigator, project manager), and describe their duties on the project. Emphasize qualifications for the proposed work. Resumes should include name, degrees earned (with school and date), certification status, current employer, current responsibilities, list of recent previous employment, a paragraph describing expertise, and up to five recent or especially relevant publications or job completions.

Denny Dawes, President
Wildlife Habitat Institute

Project Responsibilities: Management (0.25 FTE)
Revegetation (0.25 FTE)

Office:
Route 1 Box 102-A
Princeton, ID 83857

Telephone: (208) 875-1246
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e-mail: wild@potlatch.com

Education:

1997 B.S. degree candidate, Wildlife Resources, University of Idaho, Moscow
June 1998 pending completion of 100-level class. Emphasis: Communication and Habitat Management

Relevant Work Experience:

1992 – present **President**, Wildlife Habitat Institute, Princeton, ID.
Involved in all aspects of the business.

1991-1993 **Greenhouse Assistant**, University of Idaho Forestry Research Nursery, Moscow, ID. *Assisted with many phases of nursery management including greenhouse construction, seed storage and stratification, media preparation, fertilization, irrigation, and cold storage.*

1982-1991 **General Manager**, Hash Tree Company, Princeton, ID.
Managed/worked all departments including administration, landscaping, production, and sales.

1974-1977 **Heavy Equipment Operator/Foreman,** Anchorage, AK.
Worked for several construction projects for various contractors, including Alaska pipeline work for Morrison-Knudson-Rivers.

Relevant Background:

Mr. Dawes has taught numerous seminars and classes on bird and mammal identification; wildlife, forest, and wetland habitat management; cost share programs; and habitat landscaping. Mr. Dawes has provided revegetation expertise to the Lower Red River Meadow Restoration project since 1995, including the planning and implementation of all phases of the revegetation objectives and tasks. As project manager, Mr. Dawes is responsible for managing and coordinating all project activities including personnel contracts and schedules, permit application procedures, design development, communications, engineering, construction, and monitoring. Mr. Dawes is currently president-elect of the Idaho Nursery Association.

Relevant Publications:

Pocket Water, Inc., River Masters Engineering, KLP Consulting, and Wildlife Habitat Institute. 1997. Lower Red River Meadow Restoration Project FY 1997 Work Statement. Prepared for Bonneville Power Administration and Idaho County Soil and Water Conservation District.

Brunsfeld, S.J., D.G. Dawes, S. McGeehan, and D.G. Ogle. 1996. An analysis of riparian soils, vegetation, and revegetation options at Red River. D.G. Dawes (ed.) Report to Pocket Water, Inc., Idaho Department of Fish and Game, Bonneville Power Administration, and Idaho County Soil and Water Conservation District.

Finity, M., D.G. Dawes, C.B. Hardy, K. Lillengreen J.A. McCurdy, K.W. St. Amand, and J. Steelel. 1996. An environmental assessment of properties for the Coeur d'Alene Tribe.

Konopacky Environmental, River Masters Engineering, Selkirk Environmental, and Wildlife Habitat Institute. 1994. Emerald Creek Garnet Co. 404 Permit Application.

Linda R. Klein, President
LRK Communications

Project Responsibilities: Communications (0.25 FTE)
Education (0.25 FTE)

Office:
228 SW McKenzie
Pullman, WA 99163

Telephone: (509) 334-4464
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e-mail: lrklein@completebbs.com

Education:

1995	M.S. Soil Science, Washington State University, Pullman
1980	B.S. Radiography, Idaho State University, Pocatello

Relevant Work Experience:

1997 – present	**President/Technical Communications Specialist**, LRK Communications, Pullman, WA. *Involved in all aspects of the business; provide technical writing/editing, communications coordination, meeting facilitation, and contract management services.*
1995-1997	**Stream Restoration Consultant/Communications Coordinator**, River Masters Engineering, Pullman, WA. *Responsible for many phases of stream restoration work including computer aided drawing, revegetation design/specification development, permit application, wetland delineation coordination, construction supervision, topographic survey, riparian/wetland plant survey/identification, seed collection, erosion control implementation, seeding/planting/fertilizing, irrigation, monitoring, and communications coordination.*
1995-1997	**Research Associate/Instructor,** Washington State University, Pullman, WA. *Performed research/literature reviews for the publication of a college-level, introductory soil science textbook and revised two chapters for a new edition of a college-level, natural resource management textbook; taught introductory soils, soil fertility, and soil seminar classes to undergraduate and graduate students.*

Relevant Background:

Ms. Klein has been involved in the Lower Red River Meadow Restoration Project since May 1996. She has had hands-on experience in nearly every aspect of the project. Communications responsibilities include disseminating project related information to all interested parties, relaying technical information between the TAC and the ISWCD, facilitating and documenting TAC meetings and field evaluations, writing/editing project reports, and implementing public outreach activities and production of educational materials.

Relevant Publications:

Klein, L.R. 1997. Lower Red River Meadow Restoration Project: 2nd quarter report, April-June 1997. Unpublished report submitted to BPA and ISWCD.

Klein, L.R. 1997. Lower Red River Meadow Restoration Project: 3rd quarter report, July-August 1997. Unpublished report submitted to BPA and ISWCD.

Owen, O.S. and L.R. Klein. 1998. Aquatic environments. Chapter in *Natural Resource Conservation: Management for a sustainable future*. Authors: Owen, O.S., D.D. Chiras, and J.P. Reganold. Prentice Hall, Englewood Cliffs, N.J.

Owen, O.S. and L.R. Klein. 1998. Fisheries conservation. Chapter in *Natural Resource Conservation: Management for a sustainable future*. Authors: Owen, O.S., D.D. Chiras, and J.P. Reganold. Prentice Hall, Englewood Cliffs, N.J.

Peter Goodwin, P.E.
University of Idaho

Project Responsibilities: Design/Engineering (0.25 FTE)
Monitoring Coordination (0.25 FTE)

Department: Civil Engineering **Telephone:** (208) 387-1745
Office: College of Engineering, Boise **e-mail:** pgoodwin@uidaho.edu

Education:

1986	Ph.D. Hydraulic Engineering, University of California, Berkeley
1982	M.S. Hydraulic Engineering, University of California, Berkeley
1978	B.Sc. Civil Engineering, University of Southampton, U.K.

Relevant Experience: Dr. Goodwin has been the PI, lead hydrologist, or project manager of several large scale river or watershed management studies including: 'Living River Strategy' for the Napa River Watershed (1991-present), Sediment Management Plan for the North Fork Feather River (1993-96), Russian River Enhancement Plan (1992-95), Floodplain Restoration of the Willamette River (1995-96), Tijuana River and Wetland Enhancement Plan (1995-present), Review of the Sedimentation issues of the Three Gorges Dam (1995), and San Lorenzo Flood Management Plan (1985-1996). These projects utilized adaptive management strategies. He is scientific advisor to several related projects including the San Dieguito Wetland Enhancement Project. Recent related research grants include projects funded by NATO, IBM, and NOAA.

Related Activities: Dr. Goodwin is Associate Editor of the ASCE Journal of Hydraulic Engineering with responsibility for computational hydraulics and restoration of rivers and wetlands. He is involved in several national and international activities closely related to this proposal, including the International Association of Hydraulic Research (IAHR) Ecohydraulics Committee and is chair of the American Society of Civil Engineers committee on wetland restoration. Dr. Goodwin is also the organizer or instructor on several short courses on environmental river and wetland management including the ASCE Continuing Education Course on Wetland Restoration (August 1997), the University of Idaho course on Environmental River Management (May 1997), and Geomorphology in River Restoration at the University of California, Berkeley.

Relevant Work Experience:

1996-present:	Associate Professor, Department of Civil Engineering, University of Idaho
1989-1996:	Technical Director, Philip Williams & Associates, Ltd., San Francisco.

Relevant Publications:

Havno, K. and P.Goodwin.1995. Hydraulic modeling of ecological criteria: Towards an integrated approach for hydrologic, geomorphic and ecologic understanding of river corridors. Seminar 2. XXVI IAHR Congress, London.

Jordan, J.J., J. Florsheim and P. Goodwin.1995. Using water resource and riparian parameters to develop a river management program in *Water Resources at Risk.* W.R. Hotchkiss, J.S. Downey, E.D. Gutentag and J.E. Moore. American Institute of Hydrology.

Falconer, R.A. and P. Goodwin. 1994. Wetland management. Thomas Telford, London.

Goodwin, P. and R.A. Denton. 1991. Seasonal influences on the sediment transport characteristics of the Sacramento River, California. Procs. of the Instn. of Civ. Eng., Part 2, 91.

Stephen B. Bauer, President **Project Responsibilities:** Water Quality Monitoring (0.25 FTE)
Pocket Water, Inc.

Office:
8560 Atwater Drive
Boise, ID 83714

Telephone: (208) 376-3263
Fax: (208) 376-5447
email: sbauer@micron.net

Education:

1975	M.S. Zoology, University of Idaho, Moscow (Emphasis: Aquatic Ecology)
1972	B.S. Biology, University of Missouri, Kansas City

Recent Work Experience:

1992 - present: Water Resource/Fisheries Consultant, Pocket Water, Inc. *Co-authored a water quality/habitat monitoring guide for evaluation of grazing impacts for the Environmental Protection Agency; completed the water quality module of two watershed assessments in Idaho; wrote a section of a Watershed Primer for EPA with the Oregon Water Resources Research Institute, conducted lake fisheries habitat evaluation for Idaho Power, and is continuing a long-term pollutant loading study in North Idaho using event-based continuous monitoring. Mr. Bauer currently provides technical expertise to EPA on fisheries habitat issues as an Aquatic Ecologist affiliated with the Idaho Water Resources Research Institute at the University of Idaho. As a member of a consulting group, Nonpoint Source Solutions, Mr. Bauer recently completed sections of a Watershed Assessment Manual for the Oregon Governor's Watershed Enhancement Board which will be used by Watershed Councils to guide stream restoration programs.*

1978 - 1992: Environmental Scientist, Idaho Department of Health and Welfare, Division of Environmental Quality. *Evaluated the impact of timber harvests, irrigation return flows, dryland runoff, and livestock grazing, led development of the Idaho Nonpoint Source Pollution Program to comply with the federal Clean Water Act, revised the Silvicultural and Agricultural Water Quality Pollution Abatement Programs, and worked with Idaho legislature and interest groups on water quality issues.*

Relevant Background:

Mr. Bauer performed, or assisted with, many of the preliminary site analyses in the lower Red River meadow and helped the ISWCD initiate the Red River project in 1994 as a project coordinator. He has assisted the ISWCD in completing the initial restoration design, in organizing a Technical Advisory Committee, and in completing the stream alteration permits and NEPA documents. In 1996 and 1997, he developed and implemented a project monitoring and evaluation program for the project.

Relevant Publications:

Nonpoint Source Solutions. 1997. Draft - Oregon watershed assessment manual. Prepared for the Oregon Governor's Watershed Enhancement Board. Portland, OR.

Karen Kuzis Consulting. 1997. Watershed analysis of the Upper East Fork South Fork of the Salmon River: Water Quality Section. Prepared for Krassel Ranger Station, Payette National Forest, McCall, ID.

Bauer, S.B. 1996. Gold Fork watershed assessment report: Water quality section. Prepared for Boise Cascade Corp. Boise, ID.

Bauer, S.B. 1994. Water quality status report: Jump Creek, Owyhee County, Idaho, 1992-1993. Prepared for Owyhee Soil Conservation District, Marsing, ID.

Bauer, S.B. 1993. Monitoring protocols to evaluate water quality effects of grazing management on western rangeland streams, EPA 910/R-93-017, U.S. EPA, Seattle, WA.

Section 10. Information/technology transfer

How will technology or technical information obtained from the project be distributed or otherwise implemented? Methods can include publication, holding of workshops, incorporation in agency standards or facilities, and commercialization.

Elementary and Secondary School Students:
Linda Klein has a particular interest in school outreach and both ISWCD and the UI Eco-hydraulics Research Group (ERG) include educators of grade school students. Information developed as part of this project will be developed into meaningful exercises for students from grade school to high school. This will include site visits and projects that can be undertaken through data posted on the project web site. In particular, animated model simulations, remote sensing of data and video clips of the site will bring the restoration issues into the classroom. The feasibility of volunteer monitoring activities, performed by high school students, will be explored.

University Students:
In 1997, the Department of Civil Engineering at the UI brought the Introductory Survey Class to the Lower Red River Meadow Restoration site. These outdoor experiences will introduce engineers to the perspective of ecologists and natural resource managers very early in their careers. Restoration and enhancement projects are likely to form an increasing part of the activities of engineers in the coming decade and it is important for the students to see the value of an interdisciplinary approach. During a portion of this weekend field trip students were presented with an overview of the different aspects of the project and were able to observe fish counting and PIT tagging techniques. Two days were spent surveying and monitoring in the meadow.

Continuing Education:
Dr. Goodwin has organized and lectured on numerous short courses for practicing engineers and scientists, including "Geomorphology in River Restoration", "Physical Processes in Environmental River Management" and "Wetland Restoration". The "Environmental River Management" course, organized by Dr. Goodwin and ERG, drew over 120 participants to Boise in May 1997. The Lower Red River Meadow Restoration Project was one of the case studies described in this short course. ERG plans to offer one short course per year on different aspects of river restoration.

Public Information:
Informational signs are displayed at two entrances to the RRWMA. These signs will be updated annually so that the local community and Nez Perce National Forest visitors can follow the progress of the project. An Interpretive Center/Watchable Wildlife viewing platform was constructed by the IDFG from funds donated by private foundations. Interpretive signs will be displayed inside the viewing platform, illustrating the cycles of life within a wet meadow ecosystem, meadow ecosystem linkages to processes within the watershed, and principles of watershed management and river restoration.

During the field season, the field office will displays artistic renditions of various phases and conceptual designs of the restoration project and will be open to answer questions or provide tours to visitors and the local community. Organized tours will also be given to invited guests from various agencies and public and private groups.

A web-site will be prepared and maintained by the UI. Information posted to the web will include current images, model results, background information and monitoring data.

A computer will be installed at the RRWMA which will have the ability to display monitoring data collected by remote sensing, and a simulation program that will allow "what-if" scenarios to be explored by people with limited scientific understanding of the issues.

Research:
It is the intent of the Eco-hydraulics Research Group (ERG) at the University of Idaho to develop the Red River as a long-term field laboratory. Earlier restoration efforts in the watershed used different design and management philosophies. The Red River therefore provides a unique opportunity for a direct long-term comparison of the objectives of the different approaches, and the effectiveness of attaining these objectives. This comparative study will provide useful information to agencies responsible for restoration in the region.

The site will also provide a small-scale and easily monitored test area for models simulating geomorphic evolution, floodplain-river interactions, and linkages between ecology and physical processes being developed and used by ERG.

Scientific Publications/Dissemination:
The project consulting team and ERG will prepare both conference papers and peer reviewed journal articles. In particular, the project team will target the international “Eco-Hydraulics” conference in Salt Lake City in 1999. In addition, the University of Idaho will develop and maintain a database of design criteria and monitoring data. This 'living' database will be available to other scientists and engineers for research purposes or improving designs for future restoration projects. A companion manual will be prepared detailing design criteria, hydraulic geometry database, photopoint images, and design guidelines for similar projects.

Congratulations!

Thank you for completing the FY99 Proposal Form. Please print and save this file to diskette, and mail both to the address shown at the top of this document. To ensure a thorough review of your proposed work, this form will be screened for completeness. If it is not complete, it may be returned to you with a request for additional information.